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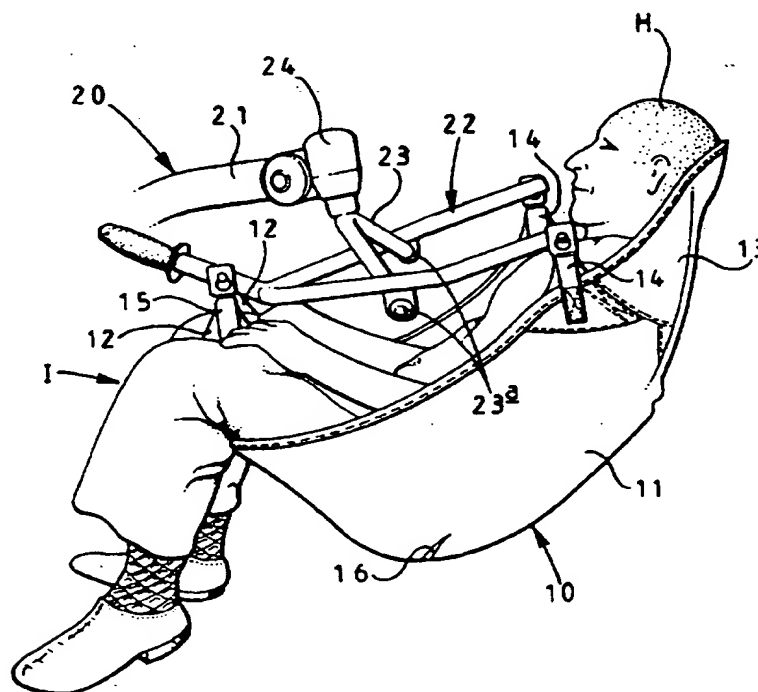
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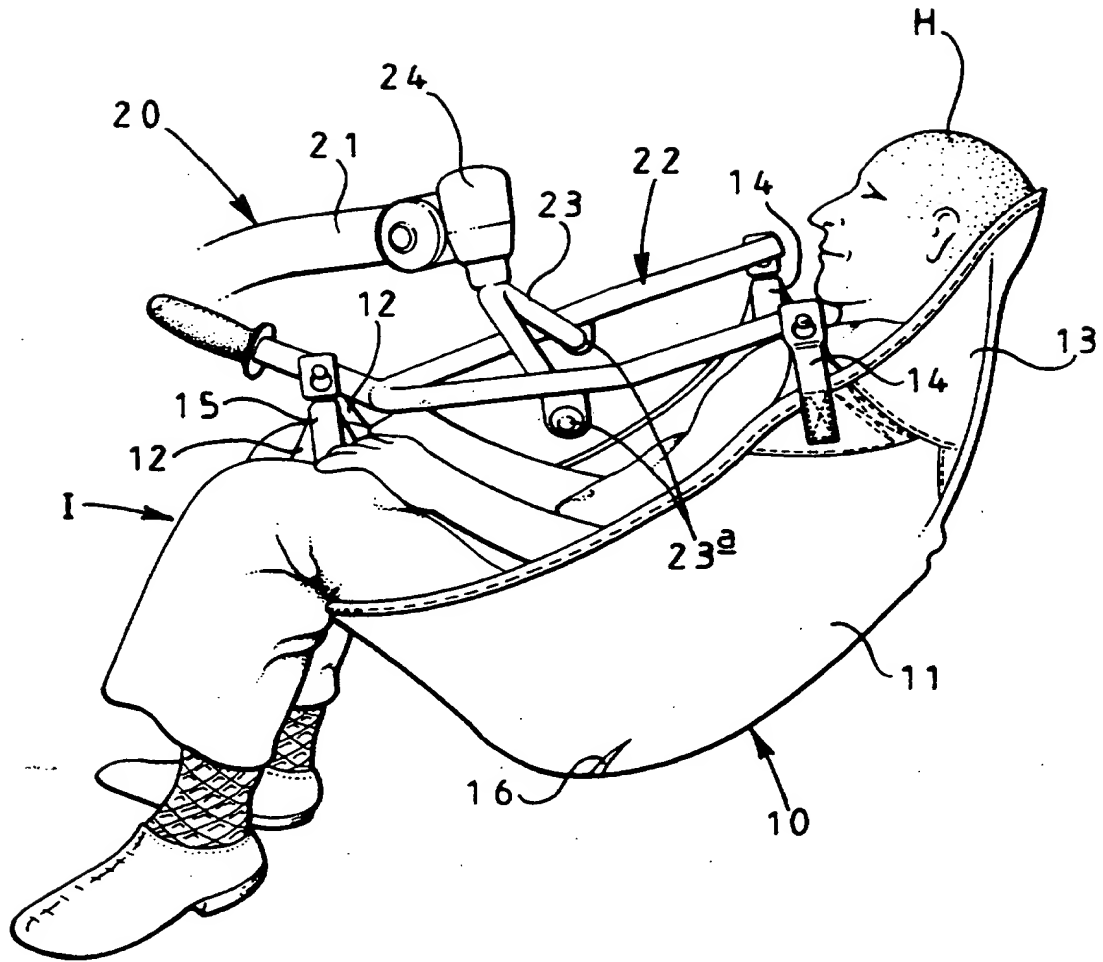
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## (54) LIFTING SLING

(57) A disposable invalid lifting sling (10) is formed of non-woven material having lower end dependent leg support portions (12) and upper end head support extension (13). The main back portion (11) is preferably formed of only a single layer of non-woven material. The material may have an embossed pattern produced by rolling to give it the appearance of a woven fabric. The slings can be formed by various techniques including chemical bonding, heat bonding or hydroentangling and are typically formed from polyester and/or polypropylene. Suspension means (14) and (15) may be attached to the sling by soluble thread to discourage laundering and re-use. A method of preventing cross-infection is disclosed wherein each person has his/her own clearly marked sling formed of non-woven material.





"Lifting Slings"

This invention relates to lifting slings for use with invalid hoists, and is particularly but not exclusively concerned with one-piece lifting slings for that purpose.

- 5 Such slings support the back and thighs of a patient, being suspended from the hoist by detachable suspension means such as straps or the like.

Known slings are formed from woven, synthetic textile material and are relatively expensive to make. The slings are used, *inter alia*, to transport patients, e.g. to the  
10 toilet. Accidents do occur and cross-infection between patients has become a major issue. As a result, some hospitals have banned the use of slings.

Laundering does not always kill off the organisms which cause infections, particularly when laundering at temperatures which the slings will withstand. As a  
15 result, slings have been laundered and, more particularly, dried at temperatures greater than the slings will withstand in an attempt to kill off all infectious organisms and this has resulted in the destruction of slings.

Also, slings are lost or damaged in transit between place of use and laundry and  
20 sufficient slings are needed so that one sling can be put to use while another is being laundered and yet another is in transit between place of use and the laundry.

According to one aspect of the present invention there is provided a disposable or limited use lifting sling formed of non-woven material.

It has been found that such slings can be made at a fraction of the cost of slings of woven material and will withstand the forces applied to them. It is, therefore, possible to dedicate slings to individual persons and to dispose of the slings after limited use so as to avoid the risk of cross-infection. The slings can be appropriately marked, such as with indelible ink, to ensure they are not used for other persons.

The slings can be formed by various different techniques including chemical bonding, heat bonding or hydroentangling and are typically formed of polypropylene and/or polyester.

The non-woven fabric can be rolled to give the appearance of woven material.

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Ideally, it should not be possible to launder the slings so as to avoid re-use and, to this end, it is envisaged that seams are secured, and suspension means are attached, to the sling by a soluble thread so that the slings will fall apart if laundering of the slings is attempted.

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The slings are, preferably, one-piece body support slings which will support the back and thighs of a patient. Four point attachment of the suspension means will be

required, with two attachment points at the sides of the sling in the shoulder region and two attachment points at the bottom end of the sling. The sling, advantageously comprises a main portion which supports the body of a person and lower end dependent leg portions which in use respectively extend beneath and upwardly between the thighs of the patient. The sling may also have an upper end head-support extension. In this case, the sling may have two further attachment points at the head region or may have one or more reinforcements extending substantially throughout the extension and for a distance beyond a line joining the sling attachment points in the shoulder region of the sling.

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The sling may be provided with darts or may be otherwise shaped so that it conforms more readily to the body shape of a person being lifted. It may also be reinforced and/or padded in regions.

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According to another aspect of the invention there is provided a method of preventing cross-infection between patients lifted in body support slings suspended from a lifting hoist wherein each patient has his/her own dedicated sling formed of non-woven material.

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Preferably, each sling is clearly marked to identify the patient for whom the sling is intended.

The invention will now be more particularly described, by way of example, with reference to the accompanying drawing which is a side perspective view illustrating one embodiment of a sling according to the invention and shown in use with a supported invalid.

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Referring to the drawing, there is shown therein a one-piece sling 10 comprising a main back portion 11 with lower end dependent leg support portions 12 and an upper end head support extension 13. The main portion 11 supports the back and shoulders of a suspended invalid I with the portions 12 respectively extend beneath and up  
10 between the thighs of the invalid whose head H is supported by the extension 13. Short extension tapes 14 providing suspension means are stitched to the main portion 11 in the shoulder regions thereof and suspension tapes 15 are similarly stitched to the ends of the leg support portions 12.

15 The sling 10 is made of non-woven polymeric material, typically polypropylene and/or polyester, and it is tailored to conform more closely to the shape of the invalid I and thus provide increased comfort for the latter. To this end, darts 16 are provided in the sling 10.

20 Typically, the sling 10 is made by heat bonding randomly orientated polymer fibres, but it could be made of drylaid, chemically bonded fabric or of drylaid, spunlace fabric (hydroentangled). This material does breathe but does not pass water and it may

be necessary to provide perforations in the sling if it is to be used for lowering invalids into a bath.

The sling 10 is, preferably, provided with an embossed pattern by rolling to give it the appearance of a woven fabric.

The sling 10 may be reinforced by an additional layer of fabric in regions where the suspension tapes 14 and 15 are stitched to the sling and the leg portions 12 may have padding between two layers of the non-woven fabric to increase comfort for the invalid.

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These slings can be made at a fraction of the cost of woven slings and are intended as disposable or limited use slings which are dedicated to individual persons to avoid the risk of cross-infection.

15 In order to support the head support extension 13, the sling may have one or more reinforcements extending substantially throughout the extension 13 and for a distance along the line joining to the points where the extension tapes 14 are stitched to the main portion 11. Alternatively, two further suspension tapes (not shown) may be connected to the head region.

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The sling illustrated in the drawing is used with a hoist 20 having a cantilever lifting arm 21 supporting a sling hanger 22 from which the sling 10 is directly suspended.

Only the outer end of the lifting arm 21 is shown, and the hanger 22 is connected to the arm through a forked connection 23. The connection 23 is mounted in a bearing 24 providing a vertical pivot axis at the end of the arm 21 and it is pivotally connected to the hanger 22 at points 23a. The arrangement is such that the hanger 22 can turn about the rigid vertical axis at the outer end of the arm 21, with the hanger 22 and the connection 23 turning as one about this vertical axis, and the hanger 22 is pivotable on the connection 23 about a transverse horizontal axis defined by the pivot points 23a.

A sling as described herein has been subjected to fifty lifts lifting 250Kg and a further fifty lifts lifting 190Kg and has withstood this test without any sign of weakening.

Ideally, it should not be possible to launder the slings. This will avoid re-use. To this end, it is envisaged that the seams may be secured, and the suspension tapes attached to the sling, by a soluble thread so that the slings will fall apart if laundering is attempted.

The invention is not limited to one-piece lifting slings, but may also be applied to other lifting slings. Also, one-piece lifting slings are not always provided with a head extension.



CLAIMS

1. A disposable or limited used lifting sling formed of non-woven material.
- 5 2. A sling as claimed in claim 1, which is made of chemically bonded fabric.
3. A sling as claimed in claim 1, which is made of heat bonded randomly orientated polymer fibres.
- 10 4. A sling as claimed in claim 1, which has been made by hydroentangling.
5. A sling as claimed in any one of the preceding claims, wherein the non-woven fabric has been rolled to give the appearance of woven material.
- 15 6. A sling as claimed in any one of the preceding claims, wherein suspension means are attached to the sling by a soluble thread.
7. A sling as claimed in any one of the preceding claims, wherein the sling is in the form of a one-piece body support sling which will support the back and thighs  
20 of a patient.
8. A sling as claimed in claim 7, wherein two attachment points are provided at the sides of the sling in the shoulder region and two attachment points are provided at the bottom end of the sling.

9. A sling as claimed in any one of the preceding claims, comprising a main portion which supports the body of a person and lower end dependent leg portions which in use respectively extend beneath and upwardly between the thighs of a patient.

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10. A sling as claimed in claim 9, further comprising an upper end head-support extension.

11. A sling as claimed in claim 10, wherein one or more reinforcements extend  
10 substantially throughout the extension and for a distance between a line joining the sling attachment points in the shoulder region of the sling.

12. A sling as claimed in any one of claims 9 to 11, wherein the main portion of the sling is formed of only a single non-woven layer of material.

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13. A sling as claimed in any one of the preceding claims, wherein darts are provided in the sling so that the sling more readily conforms to the body shape of the person being lifted.

20 14. A sling as claimed in any one of the preceding claims, wherein the sling is reinforced and/or padded in regions.

15. A sling substantially as hereinbefore described with reference to the accompanying drawing.

16. A method of preventing cross-infection between patients lifted in body support slings suspended from a lifting hoist, wherein each patient has his/her own dedicated sling formed of non-woven material.
- 5 17. A method as claimed in claim 16, wherein each sling is clearly marked to identify the patient for whom the sling is intended.



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Claims searched: 1-15

Examiner: Emma McLean  
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**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B8H (HKE, HQK)

Int Cl (Ed.6): A61G (7/10)

Other: Online:WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2,303,331 (MATTHEWS) whole document	1, 7, 8, 9, 14
X	GB 2,010,776 (BERREZOUGA) page 1, lines 64-76, page 3, lines 69-71	1
X	GB 1,174,895 (MERCANAIDS) page 1, lines 37-40	1

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

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A Document indicating technological background and/or state of the art.  
P Document published on or after the declared priority date but before the filing date of this invention.

E Patent document published on or after, but with priority date earlier than, the filing date of this application.